Li-ion BATTERY SPECIFICATION

CI CODE:
DRL Refs :

	Name and Function	Date	Signature
Prepared by	**Valérie COSCULLUELA** ✓ *AS250 Power Architect*	12/07/2010	
Checked by:	**Brigitte FOURNE** ✓ *AS250 Avionics Electrical Architect*	22/07/2010	
Approved by:	**Serge CAZALS** *AS250 Avionics Product Assurance Manager*	14-07-10	
Authorised by:	**Didier LOCHE** *Power MPC & Battery product focal point*	13/07/10	
Application Authorised by:	**Christophe LEMERCIER** *Head of Astrium EOS Satellite product definition & implementation (AET6)*	14/07/2010	

EADS ASTRIUM CONFIDENTIAL

INTENTIONALLY BLANK

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

CONTENTS

1. INTRODUCTION AND SCOPE 7
1.1 Introduction 7
1.2 Scope 7
1.3 Guidelines 7
1.4 Summary Description 7
1.5 abbreviations and acronyms 8

2. DOCUMENTS 9
2.1 Applicable documents 9
2.2 Reference documents 9

3. FUNCTIONAL AND PERFORMANCE REQUIREMENTS 10
3.1 Functional Requirements 10
3.1.1 Battery layout 10
3.1.2 Battery management 10
3.2 Performance Requirements 10
3.2.1 Power and energy requirements 10
3.2.2 Battery charge management 10
3.2.3 Protections 11
3.2.4 Battery voltage range 11

4. UNIT SPECIFIC DESIGN AND INTERFACE REQUIREMENTS 12
4.1 Mechanical Design and Interface Requirements 12
4.1.1 Mass 12
4.1.2 Centre of Gravity 12
4.1.3 Envelope 12
4.2 Thermal Design and Interface Requirements 12
4.2.1 Heat Dissipation 12
4.2.2 Unit Thermal Properties 12
4.2.3 Temperature Requirements 13
4.2.4 Thermal control 13
4.3 Electrical Design and Interface Requirements 13
4.3.1 Power Consumption 13
4.3.2 Electrical Interface Description 13
4.3.3 Electrical insulation 15
4.4 Operational requirements 15
4.4.1 Mission profile 15
4.4.2 Reliability and availability 16
4.4.3 Safety 18
4.4.4 Identification and marking 18

5. GENERAL DESIGN AND INTERFACE REQUIREMENTS 20

6. VERIFICATION REQUIREMENTS 21

7. PRODUCT ASSURANCE REQUIREMENTS 22

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

TABLES

Table 4.3-1: Connector List 14
Table 4.3-2: pin function available at power interface 14

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

INTENTIONALLY BLANK

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

SUMMARY

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

1. INTRODUCTION AND SCOPE

1.1 Introduction

AstroSAT 500 refers to a family of satellite of the 500 kg class. It is designed to operate five years in Low Earth polar orbit at an altitude of about 700 km.

The battery specified in this document is of the Li-Ion technology.

1.2 Scope

The document in hand comprises the contractually relevant requirements and constraints for the AstroSAT 500 battery. This includes:

- the performance as well as design and interface requirements of subject hardware
- the product assurance requirements
- the testing and verification requirements

•the verification method (Verif method) as one of the following : R/review of design; I/inspection; A/analysis; T/test, S/similarity, D/definition (not be tracked).

1.3 Guidelines

Requirements within this document are shown in italic font. Each requirement is preceded by a summary line that contains the following fields, delimited by "/"

- Doors requirement number.
- Requirement number in the AstroSat 500 battery specification
- Intended Verification method

BAT_11 / / T,R

The Doors Requirement Number has the form BAT_xxx/yyy/a,b/ where xxx is a unique number assigned consecutively, yyy is the requirement number in the AstroSat 500 specification and a,b are the intended verification methods.

The Intended Verification Method codes are as follows :

- **R** - Review
- **A** - Analysis
- **I** - Inspection
- **T** - Test
- **S** - Similarity

The requirement text follows the summary line. If tables are considered as part of requirement they are referenced clearly in the text and inserted after and separated from the requirement and are managed as free text attached to the identifier requirement.

All document elements not presented in the format explained above are not requirements and will not be verified or tracked.

1.4 Summary Description

Battery is mainly needed during the launch phase, to support the solar array when its power capability is lower than the consumption and in case of contingency.

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

The battery consists in the following items :

- One structure for mechanical support and thermal dissipation,
- Cells,
- Temperature sensor for temperature telemetries,
- Heaters, if applicable,
- Connectors for electrical interface,

Except otherwise specified, all requirements of the specification apply at battery level.

1.5 abbreviations and acronyms

AIT	Assembly Integration & Test
BOL	Beginning Of Life
COG	Centre Of Gravity
DOD	Depth Of Discharge
EOL	End Of Life
FDIR	Failure Detection Isolation and Recovery
ICD	Interface Control Document
MLI	Multi Layer Insulator
SOC	State Of Charge
SEU	Single Event Upset
TBC	To Be Confirmed
TBD	To Be Defined

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

2. DOCUMENTS

2.1 Applicable documents

The following documents are applicable documents to this specification. Only those parts of them are applicable for the contractors product design, test and manufacturing which are distinctly made transparent by references within this specification.

[AD 01] LXO.SP.0009.MMS-T Product Assurance Requirements

[AD 02] LXO.SP.0005.MMS-T Unit Requirement Document

[AD 03] LXO.SOW.00002.DT.ASTR Statement Of Work for delivery of Li-ion Battery for AstroSAT 500 Bus

2.2 Reference documents

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

3. FUNCTIONAL AND PERFORMANCE REQUIREMENTS

3.1 Functional Requirements

3.1.1 Battery layout

BAT_38 / 3005 / R

The battery shall be made of one module such as to comply with all the performance requirements.

3.1.2 Battery management

BAT_40 / 3015 / R

The battery functional management shall be performed at battery level.

BAT_41 / 3020 / T,R

Battery charge shall be ensured in two steps :

Charge at maximum available current, limited to a fixed value until a voltage limit is reached

Once the battery voltage limit is reached, charge at this voltage until the end of the sunlight phase

3.2 Performance Requirements

3.2.1 Power and energy requirements

BAT_44 / 3025 / R

The battery shall withstand the following cycle definition along its complete life time.

Average discharge power : 418 W during 33,5 min

Average available charge current : 10 A during 67,8 min

BAT_45 / 3030 / T,R

The battery shall provide 1 215 Wh under an average power consumption of 250 W during the spacecraft launch and until charge is started.

BAT_46 / 3035 / R

The battery shall always keep a minimum of 555 Wh reserve energy under an average power consumption of 265 W, along its complete life time, with the exception of the launch phase, for spacecraft safe mode acquisition.

BAT_47 / 3040 / R

The battery shall provide a peak power capability of 750 W in discharge over a duration of 6 seconds.

3.2.2 Battery charge management

BAT_49 / 3045 / T,R

The battery shall be current limited in charge at 37,5 A. The limitation shall not be done at battery level but at System level.

BAT_50 / 3050 / T,R

The battery shall be voltage limited at 33.6 V -0,+0.4 V . The limitation shall not be done at battery level but at System level.

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

BAT_51 / 3052 / T,R

The battery shall be able to withstand an abnormal charge current of 37,5 A during 100 ms , fifty times in life time, whatever the battery SOC is.

3.2.3 Protections

BAT_53 / 3055 / T,R

Double insulation shall be implemented in order to avoid any short circuit (including connectors) in case of single failure.

3.2.4 Battery voltage range

BAT_55 / 3060 / T,R

The battery voltage range shall be between 24 V and 34 V when used according to sections 3.2.1 to 3.2.3.

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

4. UNIT SPECIFIC DESIGN AND INTERFACE REQUIREMENTS

4.1 Mechanical Design and Interface Requirements

4.1.1 Mass

BAT_59 / 4015 / T

The overall battery mass in flight configuration shall be ≤ 20.8 kg, without interconnecting harness. This shall be verified by mass measurement on the fully assembled unit.

4.1.2 Centre of Gravity

BAT_61 / 4020 / T,A

The Centre of Gravity (CoG) w.r.t. the unit reference hole shall be provided. This shall be derived from a CoG measurement on the fully assembled unit.

4.1.3 Envelope

BAT_63 / 4025 / T

The battery including mounting feet and connectors shall not exceed the following dimensions (Width x Depth x Height): 295 mm x 355 mm x 180 mm

This shall be verified by dimension measurement.

4.2 Thermal Design and Interface Requirements

4.2.1 Heat Dissipation

BAT_66 / 4030 / T,R

According to the energy and power cycle requirements of section 3.2.1, the battery dissipation shall not exceed the following range :

	-10°C	0°C	15°C≤ <40°C
Max. Dissipation averaged over one orbit:	14 W	9 W	5,5 W
Max. Dissipation averaged over the discharge :	26 W	22 W	16 W

Above figures shall be verified in frame of unit functional testing with an accuracy of the measured value of better than 5%.

4.2.2 Unit Thermal Properties

BAT_68 / 4035 / R

The battery shall not be allowed to exchange heat by radiation. The battery shall be covered by Multi-Layer Insulator (MLI).

BAT_69 / 4040 / R

The battery heat exchange shall be done only by conduction through its base plate.

BAT_70 / 4045 / R

The battery base plate to satellite structure thermal conductivity will be better than 400 W/°C/m² (TBC).

BAT_71 / 4050 / R

The battery thermal design shall assume a maximum temperature gradient of the base plate of 2 °C.

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

4.2.3 Temperature Requirements

BAT_73 / 4055 / T

The applicable unit temperature limits are:

Operating Temperature Limits: 0 °C to +30 °C

Extended Operating Temperature Limits: -10 °C to +40 °C Note 1

Qualification Temperature Limits: -20 °C (TFQ min) to +50 °C (TFQ max) Note 2

Non operating Temperature Limits: -30 °C (TNF min) to +55 °C (TNF max)

Average Temperature (life time): ≤ +20 °C

This shall be verified by thermal testing as specified in AD 02

Note 1: The cumulative time for these extended range shall not exceed 1000 (TBC) Charge /discharge cycles as per 3025 ; Any performance which cannot be met shall be identified and justified.

Note 2: This is the Qualification range to be applied during the Thermal Vacuum tests. Full performance is not required between [-10 °C to 0 °C] and [+30 °C to +50 °C]

4.2.4 Thermal control

BAT_75 / 4060 / R

The battery shall be equipped with thermal heaters and thermal sensors that will make possible its temperature control by the On-Board Computer.

The battery shall be fitted with a redundant thermal heater and three thermal sensors used for regulation (1 nominal, 1 redundant and 1 for monitoring).

BAT_76 / 4066 / R

The thermal heaters locations are under the subcontractor responsibility .

R > 40 ohms in the extended operating temperature range, ESCC4009/002

Double layer heater recommended.

Remark: The power switching frequency shall be 1/8 Hz maximum

4.3 Electrical Design and Interface Requirements

4.3.1 Power Consumption

BAT_79 / 4070 / R

The battery shall not require any primary power supply.

4.3.2 Electrical Interface Description

4.3.2.1 Connectors

BAT_82 / 4075 / R

The battery shall be equipped with connectors in accordance with the following connector list.

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

Connector number	Connector type	Connector function
J01	DCMA 8W8S ESCC3401/001	Power (Positive lines)
J04	DCMA 5W5S ESCC3401/001	Power (Negative lines)
J02	D*M* 9P ESCC3401/001 or 002	Heater supply
J03	D*M* 25S ESCC3401/001 or 002	Telemetries

Table 4.3-1: Connector List

4.3.2.2 Power interface

BAT_86 / 4080 / R

The battery power interface shall consist of 10 AWG12 wires: 5 (positive lines)+5(negative lines). The wiring of both polarities lines shall be done to minimise as far as possible magnetic momentum.

For power interface (J01) which includes more than 5 pins, all the pins shall be externally connected to positive power lines.

BAT_732 / 4135 / R

The pin allocation shall be as in Table 4.3-2.

Power Interface (J01):	
Pins 1,2,3,4,5,6,7,8	(+)
Power Interface (J04):	
Pins 1,2,3,4,5	(-)

Table 4.3-2*: pin function available at power interface*

BAT_734 / 4145 /

Deleted

BAT_87 / 4085 / T,R

The battery internal impedance AC on the power interface shall be:

- *Lower than 20 mΩ for frequencies ≤ 1 kHz and*
- *Lower than 60 mΩ for frequencies at 10 kHz.*

This applies for 100% SOC at Tamb = 22 ±3 °C

And Lbatt : 110 nH for frequencies ≤ 10 kHz , Tamb ≥ 0 °C and at 100% SOC

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

BAT_88 / 4086 / T,A,R

The battery internal impedance DC on the power interface shall be lower than

BOL : 40 mΩ for frequencies ≤ 1 kHz , T=0 °C , 100% SOC

EOL: 120 mΩ for frequencies ≤ 1 kHz , T=0 °C , SOC Min (Vcell = 3.0 V)

4.3.2.3 Heater interface

BAT_90 / 4090 / R

The battery heater supply interface shall consists in 2 pairs of AWG20 wires.

BAT_91 / 4095 / R

The battery heater shall be supplied with a non-regulated 22 to 35 V power bus, protected by current limiters.

4.3.2.4 Battery voltage monitoring

BAT_708 / 4115 / R

Each battery module shall provide two battery voltage monitoring signals

BAT_709 / 4120 / R

The characteristics of the battery voltage monitoring interface shall be as follows :

- *Voltage range : battery voltage*
- *Protection by resistance located in the battery : 12.1 kΩ ± 0.02%, 1/4 W*

4.3.2.5 Temperature monitoring

BAT_711 / 4125 / R

Each battery module shall provide 3 temperature monitoring signals, in addition to these required in section 4.2.4

BAT_712 / 4130 / T,R

The characteristics of the temperature monitoring interface for the battery shall be as defined in [AD 02] requirements 4370 and 4380 (Betatherm - 15KOhm @25°C)

4.3.3 Electrical insulation

BAT_93 / 4140 / T,A

The impedance between any cell of the battery and its chassis shall be greater than 100 MΩ under 250 V to avoid any cell voltage drift.

4.4 Operational requirements

4.4.1 Mission profile

4.4.1.1 Lifetime

Refer to AD02.

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

4.4.1.2 Duty cycle

BAT_99 / 4150 / T,A

The battery shall be designed to withstand 100 charge/discharge (see conditions) cycles over the ground storage period and 28000 charge/discharge over the 5 years mission lifetime (nominal operations) in orbit

BAT_100 / 4151 / T,A

The battery design shall be such that EOL performances meet requirement 4150 and cumulative effects of:

- *3 years of storage under the conditions as per the User Manual*
- *2 years of AIT with an average SOC of 50% in tapering at 20°C*
- *3 capacity measurements (100% DoD at 20°C)*

4.4.2 Reliability and availability

4.4.2.1 Reliability

BAT_103 / 4155 / A

The probability of success (full achievement of the battery functions and the related performances) of the battery over 5 years shall be better than 0,99 considering the specified in-orbit duty cycle and considering the nominal environment of the battery.

4.4.2.2 Availability

BAT_105 / 4160 / T,A

The probability of occurrence of SEU whose effects lead to an outage of the main battery functions shall be less than 2 10^{-5}/day (the estimation shall take into account a minimum of 2 Solar flares during the 5 years in orbit).

4.4.2.3 Failure modes analysis

The objectives and the assumptions of the FMECA are described in the PA generic requirements, section RAMS.

Failure propagation definition

A failure occurring on a function F_A propagates on the function F_B when the failure on function F_A leads

- To stress the function F_B permanently with a level higher than the derating level,
- To stress the function F_B temporarily with a level higher than the manufacturer rating.
- To physically damage the function F_B (pollution, destruction, …).

The term *permanently* means that no action is initiated in order to control (eliminate) the failure. The failure remains active at each switching on of the function.

BAT_114 / 4170 / A

For the electrical and thermal interfaces the levels to be respected in case of failure shall be the nominal levels specified in the technical specification, unless specific levels are specified.

Severity scale

BAT_116 / 4175 / A

The failure modes and effects analysis of the battery shall consider the following severity scale:

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

1- Failure propagation outside the battery (power bus, …)

2- Degradation of the battery functions

a- n/a

b- n/a

c- n/a

d- Availability target not respected (outages on occurrence of transient phenomenon, …)

e- Degradation of the battery performances (sensors, …)

3- Effect leading to minor impact on the mission (latent failure on protection devices, …)

4- Effect without any operational impacts (telemetry not used for operate the battery, …)

4.4.2.4 Design rules

BAT_118 / 4180 / A

The battery strings shall be physically separated and no string failure shall propagate to another string through thermal means.

BAT_119 / 4185 / A

The failures which are likely to propagate (see definition) shall be controlled (which means either the failure is eliminated through redundancy, or the unit is placed into a safe state in which the propagation is no longer active)

- *Control through internal redundancy if the time for avoiding failure propagation is immediate,*
- *Control through hardwired automatism if the time for avoiding propagation is less than 10 s (TBC),*
- *Control through On-Board Software if the time for avoiding propagation is compliant with the time to react of the On-Board Software (i.e. higher than 10 s). These failures shall be detectable through battery data transmitted to the on-Board Software and the adequate resources needed to switch the battery in a safe state (i.e. no failure propagation) shall not be affected by the failure.*

BAT_120 / 4190 / A

The battery elements shall be tolerant to SEU (no physical damage)

BAT_121 / 4195 / A

The battery elements shall not be latch-up sensitive

BAT_122 / 4200 / A

The battery shall achieve all its nominal (EOL) performances despite the in-orbit cumulated radiations dose as specified in AD 02.

BAT_123 / 4205 / A

The battery shall respect all design rules specified in AD 02 regarding interface connections, cross-strapping links and FDIR features.

4.4.2.5 Single Point Failure (SPF)

BAT_125 / 4210 / A

No single failure within the battery shall lead to open circuit on more than one battery string.

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

BAT_126 / 4215 / A

No single failure within the battery shall lead to a short-circuit within the battery or within any of the strings.

BAT_127 / 4220 / A

No single failure within the battery shall lead to the loss of the battery management

BAT_128 / 4225 / A

No single failure within the battery shall lead to failure propagation outside the battery (voltage, ..)

BAT_129 / 4226 / A

No single failure within the battery shall lead to battery voltage below 23 V, including transients.

BAT_130 / 4230 / A

No single failure within the battery shall lead to permanent thermal dissipation 10% above maximum specified dissipated power specified in requirement 4030.

4.4.2.6 Feared events

This section addresses some specific events identified in the system risk analysis and specifies the related requirements.

BAT_133 / 4250 / A

The battery shall be able to withstand:

a) 19V minimum for 500 ms (TBC) without damage

b) 24 V to 20 V minimum voltage during 20 min with average power of 265 W @ 0°C min

c) 20V minimum voltage with no current for indefinite time.

4.4.3 Safety

BAT_135 / 4300 / A

The battery shall be designed in order to avoid any hazard once the battery is packaged.

BAT_136 / 4302 / A

The battery shall be designed in order to include an on-ground protection on the top side of the battery, to avoid any electrical hazard once the battery is packaged. The design of this protection shall be submitted to prime for approval (with Mechanical ICD).The protection is for on-ground operation only and will not be submitted to Thermal vacuum and vibration.

4.4.4 Identification and marking

BAT_138 / / R

The unit hardware shall be marked by a nameplate in order to achieve configuration traceability. The identification shall be made by a label containing the following information:

- *Project Name : AstroSAT 500*
- *Unit Name / Model : BAT EM/PFM/FM2/… (*)*
- *PT Item Code: : TBD*
- *Serial Number : TBD by supplier*
- *Drawing Number : TBD by supplier*

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

Individual unit shall be marked with a serial number. For standard parts and where the physical size of an item precludes identification of the hardware itself, a 'bag and label' technique shall be used (up to final integration).

(*) as appropriate

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

5. GENERAL DESIGN AND INTERFACE REQUIREMENTS

Refer to AD 02.

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

6. VERIFICATION REQUIREMENTS

Refer to AD 02 and AD 03 for generic verification requirements.

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

7. PRODUCT ASSURANCE REQUIREMENTS

Refer to AD 01.

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

CHANGE LOG

Note:

This log is autogenerated from Doors. Special symbols may not be rendered correctly and hence the main body of the document shall always take precedence for requirements. Thus it should only be used as a guide to the modifications in the document and not as a substitute.

Modified Objects

In the following table modifications to the Object Text attribute are shown using red line markup. For other attributes the new value and the old value are shown in separate columns.
The codes used in the object type (OT) column are: Rq = Requirement, Inf = Information, Hd = Heading, Ah = Applicability Matrix Heading, Ar = Applicability Matrix Requirement

Identifier	Attribute	OT	New Text	Old Text
BAT_86 section 4.3.2.2	Object Text	Rq	The battery power interface shall consist of ~~8~~10 AWG12 wires: ~~4~~5 (positive lines)+~~4~~5(negative lines). The wiring of both polarities lines shall be done to minimise as far as possible magnetic momentum.	
BAT_732 section 4.3.2.2	Object Text	Rq	The pin allocation ~~is~~shall ~~listed~~be as in Table 4.3-2.	
BAT_733 section 4.3.2.2	OLE	Inf	Figure/Table modified	
BAT_734 section 4.3.2.2	Object Text	Rq	~~The pins which are not used in Table 4.3-2 shall be double insulated with no possibility of electrical charge on these pins.~~ Deleted	
BAT_734 section 4.3.2.2	Intended Verification Method	Rq		R

Inserted Objects

Identifier	Object Type	Text
BAT_791 section 4.3.2.2	Information	For power interface (J01) which includes more than 5 pins, all the pins shall be externally connected to positive power lines.
BAT_793 section 8.1	TBD	02/01
BAT_796 section 8.1	TBD	Connector pins update

Deleted Objects
9 differences found

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

Requirement/Section Cross Reference

Page numbers are the pages where the sections start

BAT_11 ..... 1.3.....7
BAT_38 ..... 3.1.1.....10
BAT_40 ..... 3.1.2.....10
BAT_41 ..... 3.1.2.....10
BAT_44 ..... 3.2.1.....10
BAT_45 ..... 3.2.1.....10
BAT_46 ..... 3.2.1.....10
BAT_47 ..... 3.2.1.....10
BAT_49 ..... 3.2.2.....10
BAT_50 ..... 3.2.2.....10
BAT_51 ..... 3.2.2.....10
BAT_53 ..... 3.2.3.....11
BAT_55 ..... 3.2.4.....11
BAT_59 ..... 4.1.1.....12
BAT_61 ..... 4.1.2.....12
BAT_63 ..... 4.1.3.....12
BAT_66 ..... 4.2.1.....12
BAT_68 ..... 4.2.2.....12
BAT_69 ..... 4.2.2.....12
BAT_70 ..... 4.2.2.....12
BAT_71 ..... 4.2.2.....12
BAT_73 ..... 4.2.3.....13
BAT_75 ..... 4.2.4.....13
BAT_76 ..... 4.2.4.....13
BAT_79 ..... 4.3.1.....13
BAT_82 ..... 4.3.2.1.....13
BAT_86 ..... 4.3.2.2.....14
BAT_87 ..... 4.3.2.2.....14
BAT_88 ..... 4.3.2.2.....14
BAT_90 ..... 4.3.2.3.....15
BAT_91 ..... 4.3.2.3.....15
BAT_93 ..... 4.3.3.....15
BAT_99 ..... 4.4.1.2.....16
BAT_100 ..... 4.4.1.2.....16
BAT_103 ..... 4.4.2.1.....16
BAT_105 ..... 4.4.2.2.....16
BAT_114 ..... 4.4.2.3.....16
BAT_116 ..... 4.4.2.3.....16
BAT_118 ..... 4.4.2.4.....17
BAT_119 ..... 4.4.2.4.....17
BAT_120 ..... 4.4.2.4.....17
BAT_121 ..... 4.4.2.4.....17
BAT_122 ..... 4.4.2.4.....17
BAT_123 ..... 4.4.2.4.....17
BAT_125 ..... 4.4.2.5.....17
BAT_126 ..... 4.4.2.5.....17
BAT_127 ..... 4.4.2.5.....17
BAT_128 ..... 4.4.2.5.....17
BAT_129 ..... 4.4.2.5.....17
BAT_130 ..... 4.4.2.5.....17
BAT_133 ..... 4.4.2.6.....18
BAT_135 ..... 4.4.3.....18
BAT_136 ..... 4.4.3.....18
BAT_138 ..... 4.4.4.....18
BAT_708 .....4.3.2.4 15
BAT_709 .....4.3.2.4 15
BAT_711 .....4.3.2.5 15
BAT_712 .....4.3.2.5 15
BAT_732 .....4.3.2.2 14
BAT_734 .....4.3.2.2 14

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

DOCUMENT CHANGE DETAILS

ISSUE	CHANGE AUTHORITY	CLASS	RELEVANT INFORMATION/INSTRUCTIONS
01			Initial release (07/05/09)
02			Consistency with AS500 specification Is02, impedance change
02/01			Connector *pins update*

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

DISTRIBUTION LIST

	Corporate use	Project Limited
Document internal Classification	X	

Controlled	Configured
	X

Astrium AS250 Avionics Team	Distribution
BARADAT Pierre	
BILLIEN Jean Luc	
BONNEAU Celine	
CAZALS Serge	X
COSCULLUELA Valerie	X
DEFENDINI Ange	
FOURNE Brigitte	X
GALLAND Philippe	
GENTY Patrick	
GILLOT Bernard	
GUIONNET Pascal	
FAVREAU Michel	
LEBLOND Philippe	

Astrium AS250 Avionics Team	Distribution
LEBREDONCHEL Jerome	
MARCILLE Herve	X
MARTINEZ Alain	
CHUPIN Stephane	
PALOUS Jean-Claude	
POQUET GOURDON	
PREVOT Sylvain	
TABOUELLE Alain	
TEOFILI Fabrice	
THIBAUD Pierre	
PENALVA Sonia	X
AS250 Documentation	X
AS250 Configuration manager	X

Astrium Product Policy	Distribution
BARABOTTI Laurent	X
LEMERCIER Christophe	X
PITZ Wolfgang	

Astrium MPC	
ALCINDOR Peter	X
BALDWIN Robert	
BARRIERE Jacques	
BERTHELIER David	
CAMILLERI Stephane	
DEBUS Volker	
JANVIER Michel	
OESTERLE Eduard	

Astrium AstroTerra	Distribution
ALARY Sébastien	X
BELLEAU Patrick	
BORDE Jacques	
BOUSQUET Christophe	X
DAREL Anthony	X
HAMEURY Olivier	
PONCIN Thierry	
SIGUIER Michel	
VIVIER Jean Maurice	
ASTROTERRA	X
ASTROTERRA Configuration	X

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium

Astrium Product Policy	Distribution
SCHWAB Armin	

Astrium AstroTerra	Distribution

ECE Seosat Project	Distribution
BORGES ALEJO Andrés	X
SANZ CUESTA Juan Andrés	X
PERAN Francisco	X
CORTES David	
LOPEZ Amador	
BOURGEAL Silvia	
GIL Miguel Angel	
LIZONDO Jose Luis	
DE MIGUEL Elena Diana	
PALACIOS Cristina	
SEOSAT Documentation	X
SEOSAT Configuration	X

Astrium CSO Project	Distribution
CORREGE Alain	
GARCES Sylvain	
JACOMOND Alain	
LOCHE Didier	
LUZURIER Jérôme	
MONTEIL Denis	
SIBILLA Christian	
TOURNIER Thierry	
VILLEFRANCHE Patrice	
CSO Documentation	
GALLAND Philippe	X
LOCHE Didier	X

The copyright in this document is the property of EADS ASTRIUM SAS and the contents may not be reproduced or revealed to third parties without prior permission of that company in writing.

© EADS Astrium